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SOME ACARIDAE FROM BEES AND WASPS

(ACARINA)

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While studying the biology of various species of bees and wasps, K. V. Krombein of the U. S. Department of Agriculture collected many mites living in association with these insects. Most of the mites belonged to the family Saprogllyphidae, and have been described in another paper. Those described in this paper, however, are members of the family Acaridae, even though they may superficially appear to belong to the Saprogllyphidae. Adults, as well as hypopial nymphs, were obtained in three of the four species studied. The hypopial nymphs are quite distinct generically, but the adults are more or less nondescript. Consequently, the genera and species are based upon the hypopial forms. The biological notes on these mites and their hosts are discussed by K. V. Krombein in the following paper; rearing nest numbers are given here for correlation with his studies. I wish to take this opportunity to thank A. M. Hughes of London for her help.

Genus *Horstia* Oudemans, 1905

Zakhvatkin (1941) stated that the adult of *Horstia* was known from only one species, *Horstia trifilis* (Canestrini), and that it was superficially described. The female lacked genital discs, but this statement is considered doubtful since these discs are typical for the Acaridae, and the male and female here studied possess these organs. The hypopus has a distinctive dorsal reticulate pattern, the gnathosoma consists of two setal bearing tubercles; and the generalized adults possess bifurcate pseudostigmata.

Previously, the genus had been placed in the Chaetodactylinae (Glycyphagidae) (Zakhvatkin, 1941), and later in the Saprogllyphidae (= Ensliniellidae) (Baker and Wharton, 1952). The presence of the empodial rods, however, necessitates placing these mites in the Acaridae.

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**Horstia virginica**, new species

(Figs. 1-11)

*Hypopus*.—Propodosoma lightly reticulate, setae strong, anterior propodosomals long, strong. Hysterosoma longitudinally marked dorsomedially, tuberculate latero-posteriorly; dorsomedial setae strong, marginal setae weaker. Ventrally, coxal apodemes enclosed as figured; suctorial plate simple, with three pairs of large discs; gnathosoma consisting of two tubercles with setae. All tarsi with empodial claws well set into tarsi; empodial rods present although not conspicuous; tarsi of legs I, II, and III with 4 lanceolate setae each; tarsus IV with 4 long whiplike setae; legs strongly sclerotized. Total length 350  $\mu$ ; width 178  $\mu$ .

*Adults*.—Male and female similar. Tarsus I sensory rod tapering to point. Male with distinct propodosomal shield; female shield indistinct. Setal pattern of both sexes as figured; dorsal setae of male weak, short, except for the long outer propodosomals; setae of female weak, but longer than in male, the propodosomals subequal. Pseudostigmatic organ of both sexes similar, a strong, bifurcate organ (in one female it is trifurcate). Tarsus I of both sexes as figured; tarsus IV of male with discs located on distal and proximal ends of segment. Genitalia of male between coxae IV; anal discs present, as figured. Genital opening of female lying anterior to coxae III and extending posteriorly to coxae IV; setal pattern of anal area as figured. Male body 350  $\mu$  long by 190  $\mu$  wide; female body 478  $\mu$  long by 248  $\mu$  wide.

*Holotype*.—Hypopial nymph, U. S. National Museum No. 2729 taken from nest of the xylocopid bee, *Xylocopa virginica krombeini* Hurd, Lake Placid, Florida, June 2, 1960 (at Washington, D. C.), by K. V. Krombein, collector.

*Paratypes*.—Four hypopial nymphs, nine males, and thirteen females with the above data.

The mites are from nest numbers B-66, B-106, and B-189.

Genus **Tortonia** Oudemans, 1911

*Tortonia* was known only from the hypopial nymphs, but now both sexes of adults have been found. Adults are unique in having a pebbled skin dorsally, and in that the male lacks anal discs. The hypopus lacks the gnathosoma. As with *Horstia*, these mites have been variously placed, but they belong in the family Acaridae.

**Tortonia quadridens**, new species

(Figs. 12-19)

*Hypopus*.—Propodosoma and hysterosoma lightly reticulate, the pattern on the propodosoma more or less transverse; that on the hysterosoma longitudinal, the pattern composed of broken striae laterally and posteriorly as figured. Outer propodosomal setae longer than other body setae, strong, not serrate; inner propodosomals fine, about  $\frac{1}{2}$  as long as outer. Humeral setae of hysterosoma longer and stronger than others; the first two pairs of dorso-median setae strong, about  $\frac{1}{3}$  as long as humerals; other hysterosomal setae shorter, as figured. Gnathosoma lacking, only aristae present. Ventral apodemes of coxae free, curving, as figured. Suctorial plate small, round, on posterior of body. Legs as

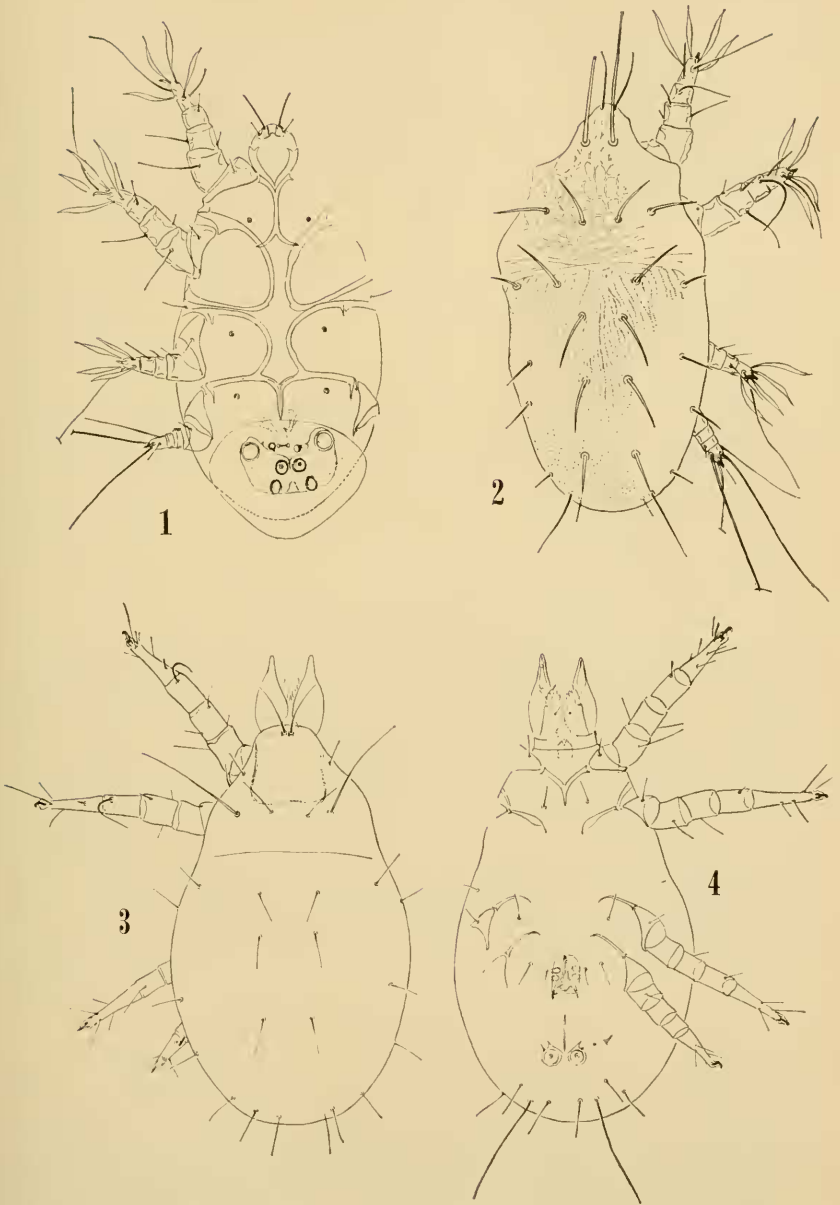


Plate I. *Horstia virginica*, new species. Fig. 1, venter of hypopus; fig. 2, dorsum of hypopus; fig. 3, dorsum of male; fig. 4, venter of male.

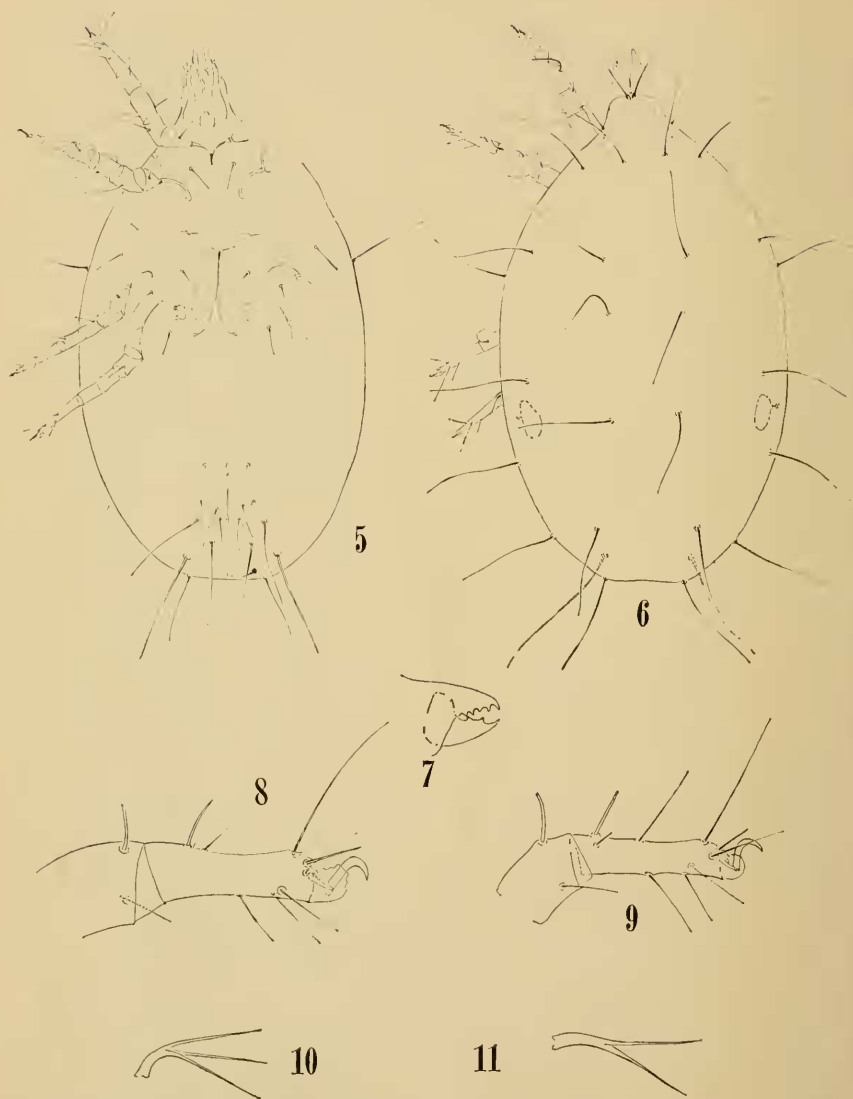


Plate II. *Horstia virginica*, new species. Fig. 5, venter of female; fig. 6, dorsum of female; fig. 7, chelae of female; fig. 8, tarsus I of male; fig. 9, tarsus I of female; figs. 10 and 11, pseudostigmatic organs of female.

figured; setal pattern normal for genus; leg IV without empodial claw, ending in three long, whiplike setae. Total length 191  $\mu$ ; width 140  $\mu$ .

*Male and female*.—Both sexes similar, characterized by the tuberculate skin and strong, spinelike dorsal body setae, those of the male being shorter than those of the female. Propodosomal shield present in both sexes. Pseudostigmatic organ similar in both sexes, simple, with six to seven branches. Male genitalia between coxae IV; female genitalia between coxae III and IV; genital and anal setae as figured; no anal discs in male, but discs present on tarsus IV of male; these discs small, closely set distally. Male body 306  $\mu$  long by 178  $\mu$  wide; female body 319  $\mu$  long by 153  $\mu$  wide.

*Holotype*.—Hypopial nymph, U. S. National Museum No. 2730, taken on venter of abdomen of the vespid wasp, *Monobia quadridens* (L.), Kill Devil Hills, North Carolina (at Washington, D. C.), by K. V. Krombein, July 4, 1956.

*Paratypes*.—Three hypopial nymphs with the above data. One male and two females taken on cell wall of nest of *Monobia quadridens* (L.), Kill Devil Hills, North Carolina (at Washington, D. C.), by K. V. Krombein, October 11, 1956. One female paratype with same data but collected September 19, 1956.

One female and five nymphs from nest number C-727, and one male from nest number C-706.

#### Genus *Lackerbaueria* Zakhvatkin, 1941

The mites discussed here are intermediate between *Forcellinia* and *Lackerbaueria* in the hypopial state, but the adults are not typical of *Forcellinia*, differing principally in the type of dorsal setae. The adults are also similar to *Kuzinia*, but the legs lack the longitudinal ridge, and the position and length of the dorsal setae differ. At present the species are being included in the genus *Lackerbaueria*, even though there are some differences in the suctorial plates of the hypopial nymphs.

The hypopi possess strong dorsal body setae, and strongly sclerotized coxae; the gnathosoma is prominent. The adults are generalized acarids, the male is distinctive in having an almost straight, simple aedeagus; both male and female possess a heavily pectinate pseudostigmatic organ.

#### *Lackerbaueria krombeini*, new species

(Figs. 17-28)

*Hypopus*.—Propodosomal setae thin, short. Hysterosomal setae strong, heavily serrate. Dorsum of hysterosoma punctate, forming pattern as figured; propodosoma without pattern. Gnathosoma distinct, longer than broad, extending past anterior margin of propodosoma. Ventral apodemes as figured; sternum almost reaching posterior margin of sternal plate; apodemes I and II open, III and IV enclosed. Coxal I seta dislike; coxal III seta also dislike, situated on sclerotized margin of coxa. Suctorial plate as figured, outer disc anterior to inner disc. Tarsi I and II as figured, sensory rod on tarsus I less than  $\frac{1}{2}$  as long as

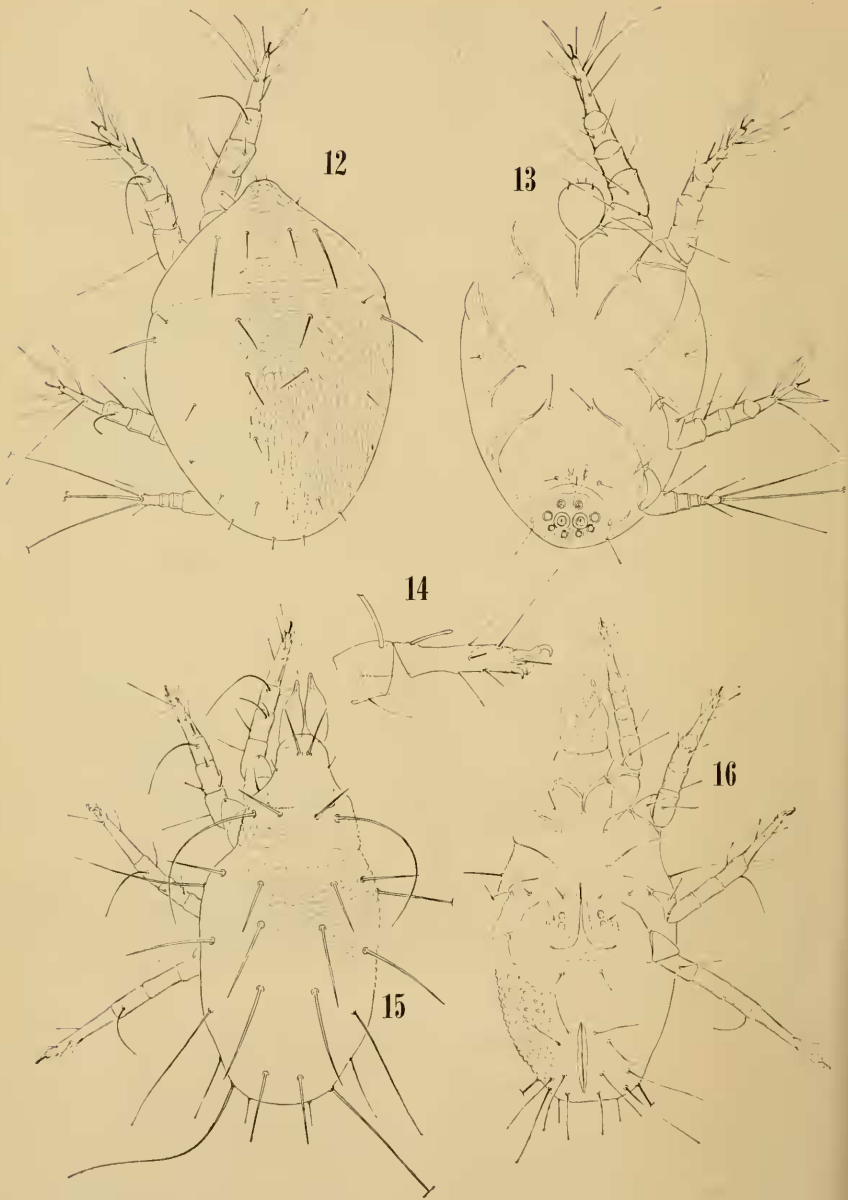


Plate III. *Tortonia quadridens*, new species. Fig. 12, dorsum of hypopus; fig. 13, venter of hypopus; fig. 14, tarsus I of female; fig. 15, dorsum of female; fig. 16, venter of female.

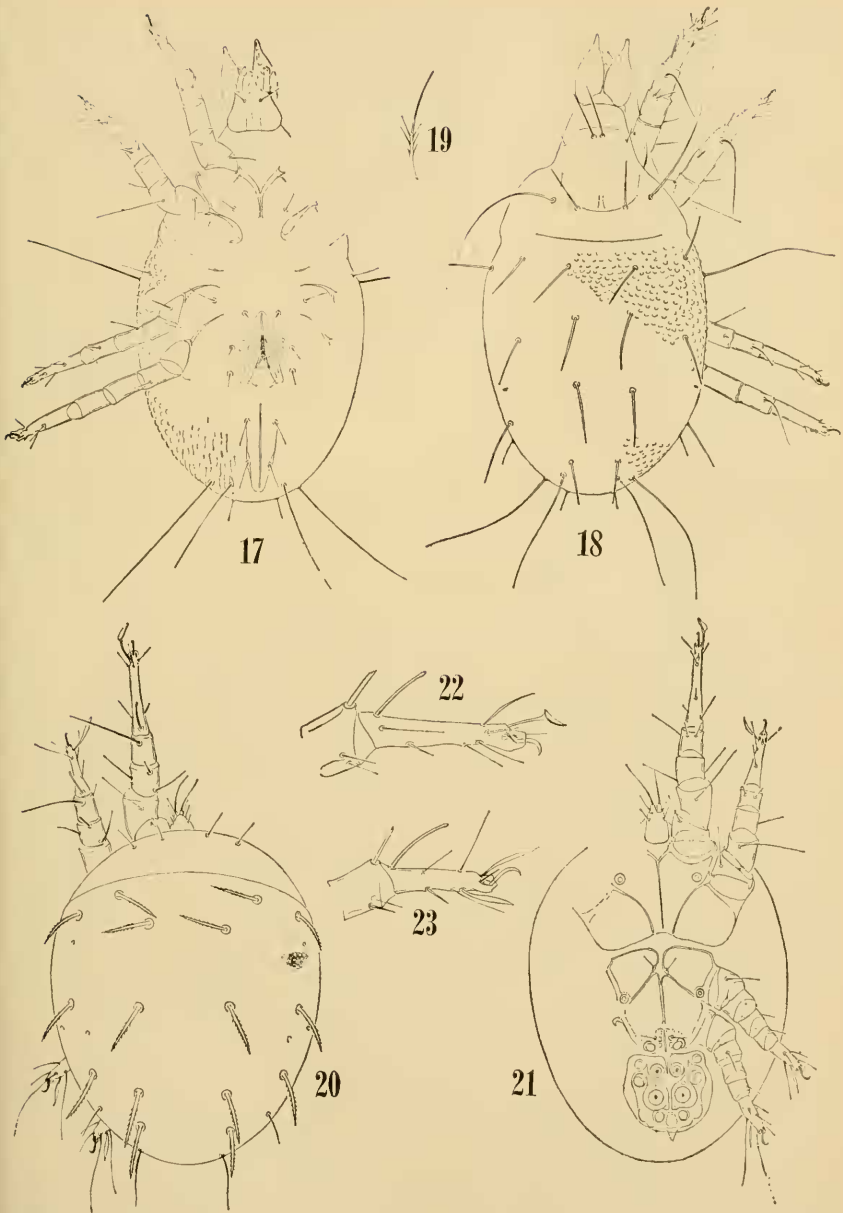


Plate IV. *Tortonion quadridens*, new species. Fig. 17, venter of female; fig. 18, dorsum of female; fig. 19, pseudostigmatic organ of female. *Lackerbaueria krombeini*, new species. Fig. 20, dorsum of hypopus; fig. 21, venter of hypopus; fig. 22, tarsus I of hypopus; fig. 23, tarsus II of hypopus.

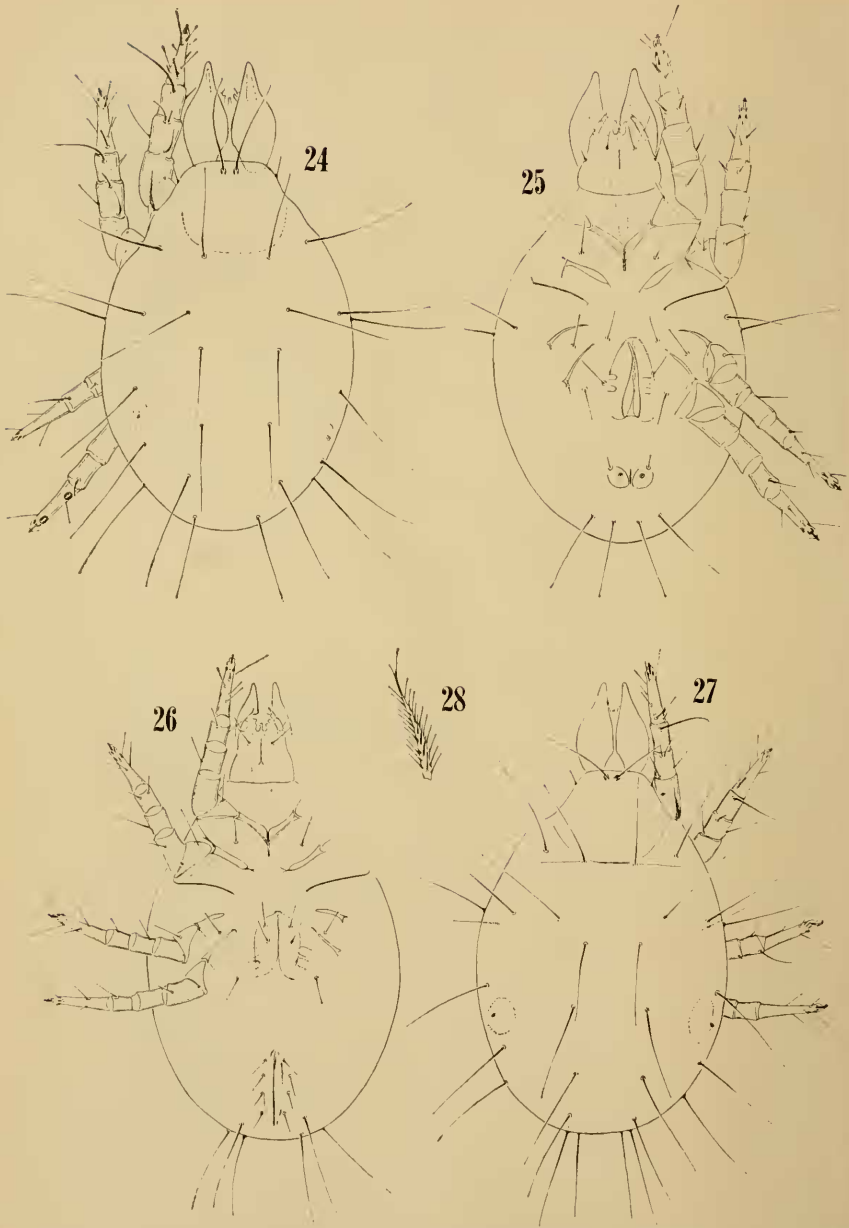


Plate V. *Lackerbaueria krombeini*, new species. Fig. 24, dorsum of male; fig. 25, venter of male; fig. 26, venter of female; fig. 27, dorsum of female; fig. 28, pseudostigmatic organ of female.



tarsus; that on tarsus II slightly longer than  $\frac{1}{2}$  length of tarsus; ventral setae of tarsi I and II sharp, spinelike. Total length of body  $255 \mu$ ; width  $185 \mu$ .

*Adults*.—Male and female similar, with long, simple weak body setae. Both sexes with propodosomal shield. Pseudostigmatic organ heavily pectinate, similar in both sexes. Male aedeagus very slightly s-shaped; anal discs egg-shaped; posterior anal setae long, of equal length, in transverse row; tarsal IV discs large, situated proximally and distally on tarsus. Male body  $427 \mu$  long by  $261 \mu$  wide; female body  $574 \mu$  long by  $350 \mu$  wide.

*Holotype*.—Hypopial nymph, U. S. National Museum No. 2731, taken from adult female of pemphredonine wasp, *Diodontus atratus parenosus* Pate, Arlington, Virginia, July 4, 1952, by K. V. Krombein.

*Paratypes*.—One paratype hypopus with the above data. Five paratype hypopi taken on adult male of pemphredonine wasp, *Passaloeccus annulatus* (Say), Arlington, Virginia, May 21, 1955, by K. V. Krom-

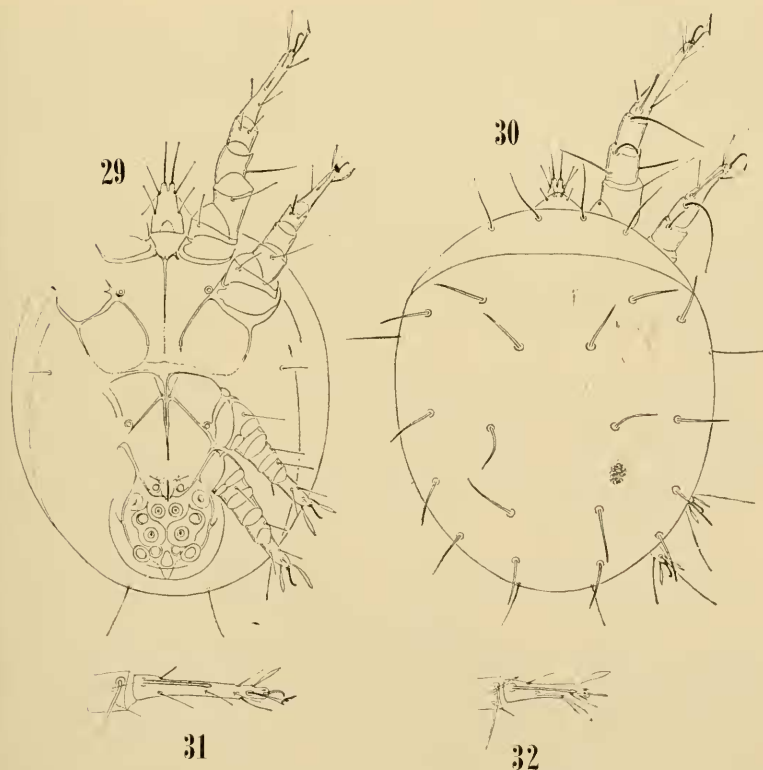


Plate VI. *Lackerbaueria americana*, new species. Fig. 29, venter of hypopus; fig. 30, dorsum of hypopus; fig. 31, tarsus I of hypopus; fig. 32, tarsus II of hypopus.

bein. Six males and three female paratypes taken in nest number A-5 of *Diodontus atratus parcinosus* Pate, Arlington, Virginia, June 26, 1959, by K. V. Krombein. Two paratype males taken in the same nest, June 29, 1959, by K. V. Krombein.

**Lackerbaueria americana**, new species

(Figs. 29-32)

*Hypopus*.—Similar to *Lackerbaueria krombeini*. Dorsal setal pattern similar, but propodosomal setae longer; hysterosomal setae of same length but more slender, whiplike, and nude. Venter similar, although sternum not as long; differences in the suctorial plate may be due to mounting. Gnathosoma distinct, longer than broad, extending past anterior margin of propodosoma. Leg setae as figured; inner ventral tibia II seta spinelike, others setiform. Sensory setae of tarsus I slightly more than  $\frac{1}{2}$  as long as tarsus; sensory seta of tarsus II about as long as tarsus; ventral seta of tarsus I setal-like, but ventral seta of tarsus II blunt, spinelike. Tarsi I and II each about  $\frac{2}{3}$  as long as in *L. krombeini*. Total length 204  $\mu$ ; width 153  $\mu$ .

*Adults*.—Not known.

*Holotype*.—Hypopial nymph, U. S. National Museum No. 2732, taken on female of the pemphredonine wasp, *Stigmus americanus* Packard, Arlington, Virginia, May 21, 1955, by K. V. Krombein.

*Paratypes*.—Five hypopi with the above data.

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